Chemical Proof of the Formation of H_2O_2 on the Atmospheric Corrosion of Metals

Member of the Academy of Sciences, as well as to the participants of the seminary. From the experimental part can be seen that two micro-methods were used for the determination of hydrogen peroxide vapors, i. e. one with the reagent being on the dried filter paper, and the other with the correspondingly prepared photofilm. The obtained results carried out by means of 12 reagents on 19 metals are mentioned in a table. The reagent by Deniges (Ref 29) proved to be most sensitive, as well as $K_4/Fe(CN_6)/ + FeCl_3$, which was also used on the photographic film and for experiments on the kinetics of the formation of hydrogen peroxide on the atmospheric corrosion of magnesium. Lead sulfide was used analogously, however, not with quite as good results. The preparation of a Ni_2O_3--reagent is described as well. The formation of H_2O_2 was also observed on a stainless steel 18/8 and a gold alloy 916. Finally the author states that on the surface of electronegative, as well as electropositive metals hydrogen peroxide forms in the presence of humidity on ordinary atmospheric corrosion. The author thanks Ye. M. Vasil'yeva for her collaboration. There are 1 table and 32 references, 13 of which

Chemical Proof of the Formation of H_2O_2 on the Atmospheric Corrosion of Metals

are Soviet.

ASSOCIATION: Odesskiy tekhnologicheskiy institut
(Odessa Technological Institute)

SUBMITTED: February 8, 1957

1. Hydrogen peroxide---Synthesis 2. Metals---Corrosion
3. Hydrogen peroxide vapors---Determination
4. Photographic emulsions---Photochemical reactions

Card 3/3

AUTHORS: Roykh, I. L., Bolotich, I. P. SOV/ 20-120-1-31/63

TITLE: The Mechanism of the Vertical Distribution of H_2O_2 Over a Solution (Mekhanizm vertikal'nogo raspredeleniya H_2O_2 nad rastvorom)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 120, Nr 1, pp. 116 - 118 (USSR)

ABSTRACT: In a previous paper by I.L.Roykh (Ref 1) it was shown that the photographically active particles separating in the atmospheric corrosion at the surface of metals decrease according to an exponential law with increasing distance. These particles are H_2O_2-molecules. It therefore may be expected that there also is a vertical distribution for the hydrogen peroxide vapors separating from the solution. In order to prove this the following experiments were carried out: An aqueous solution of hydrogen peroxide of a certain concentration was poured into a bulb and a photographic plate was mounted at a small angle to the surface of the solution. The experimental conditions are discussed. A linear dependence of the blackening D on its height h above

Card 1/4

The Mechanism of the Vertical Distribution of H_2O_2 30//2e-12e-1-51/63
Over a Solution

the surface of the hydrogen peroxide solution was found as a result of these experiments: D = -bh + A; where b and A denote constants. The obtained curves result from the averaging of the data of 15 experiments with constant duration of exposure. The aim of the further investigation was the explanation of the mechanism of the vertical distribution of the vapors separated from the H_2O_2 solution. The number of hydrogen peroxide molecules decreases exponentially with the height above the solution. Also by theoretical considerations an equation is found which is analogous to the first written down and experimentally determined equation. The slope of the particles depends on the number of the existing dust particles. With increasing number of the dust particles causing the decomposition of H_2O_2 the slope of the straight decreases towards the axis of the abscissa. In order to prove experimentally the mentioned formula the dependence of D on h in the case of dusty air and air partly free of dust above the surface of the H_2O_2-solution was determined. The performance of the experiments is described. The results of these

Card 2/4

experiments tend to show the following: The decomposition of the hydrogen peroxide molecules evaporated from the solution which increases with increasing height is connected with the existence of dust particles in the air. Finally the authors thank A.N.Frumkin, Member, Academy of Sciences, USSR, for his mentioning the possibility of the discussed vertical distribution of H_2O_2. There are 2 figures and 7 references, which are Soviet.

ASSOCIATION: Odesskiy tekhnologicheskiy institut im. I.V. Stalina (Odessa Technological Institute imeni I.V.Stalin)

PRESENTED: January 2, 1958, by A.N.Frumkin, Member, Academy of Sciences, USSR

SUBMITTED: November 21, 1957

The Mechanism of the Vertical Distribution of H_2O_2 SOV/ 20-120-1-31/63
Over a Solution

1. Hydrogen peroxide vapors

Card 4/4

ROYKH, I.L.

Determination of the energy of activation during action of H_2O_2 on the photolayer. Ukr. khim. zhur. 24 no.4:459-461 '58.

1. Odesskiy tekhnologicheskiy institut im. I.V. Stalina, kafedra fiziki.
(Hydrogen peroxide) (Heat of activation) (Photochemistry)

ROYKH, I.L.; YARPOVETSKIY, L.Ya. (Odessa)

Chemical electron emission. Usp.Khim. 28 no.2:168-188
F '59. (MIRA 12:4)
(Electron emission)

ROYKH, I.L.

Emission of electrons and H_2O during the corrosion of metals [with summary in Emglish]. Zhur.fiz.khim. 33 no.2:288-293 F '59. (MIRA 12:4)

1. Odesskiy tekhnologicheskiy institut im. I.V. Stalina.
(Electron emission) (Corrosion and anticorrosives)

5(4)

AUTHORS: Roykh, I. L., Yarpovetskiy, L. Ya., (Odessa) SOV/74-28-2-3/5

TITLE: Chemical Electron Emission (Khimicheskaya elektronnaya emissiya)

PERIODICAL: Uspekhi khimii, 1959, Vol 28, Nr 2, pp 168-188 (USSR)

ABSTRACT: In the present paper the authors give a general view of the main results obtained by investigations of the chemical emission. Since this is a matter of single investigations, no final conclusions can be drawn as yet. The chemical emission was investigated by various authors in various ways: by means of the drop-weight method (Refs 18, 19-26, 28 et al) at low pressure (Refs 44, 45) by point counter tube (Ref 31) with cylindrical counters (Refs 32, 34-36, 39, 40) as well as with copper tubes. Recently chemical emission has been investigated by an electron multiplier tube (Refs 41-43). From the results obtained it may be seen that the chemical emission is primarily conditioned by electrons. For this reason the authors consider the whole emission flow to be an electron flux in order to simplify matters and use the term chemical electron emission. The investigations of the

Card 1/4

emission dependence on reactive substances have shown that the emission of charged particles occurs during a chemical reaction on the metal surface. It takes place only in the presence of active gases (Refs 17, 23, 25-28). Its intensity is increased with increasing energy released during the reaction (Ref 18). It was found that the presence of gaseous oxygen and a metal surface free from oxide are prerequisites for the emission (Refs 35-38). On comparing the emission intensities of various metals the authors came to the conclusion that the intensities correspond to the position of these metals in the periodic system (Ref 41). The emission of refined metals, which apparently are not in any connection with chemical processes, was investigated (Refs 31, 32, 41, 42, 48). The conclusions drawn by numerous authors from the time dependence of emission on the oxidation mechanism of metals in various stages appear to be premature. The investigations of temperature dependence do not yet permit any generalization (Refs 31, 33-37, 40, 44, 45, 48, 54, 58). The dependence of the emission flow in the electric field and the distribution of emitted electrons according to energies were investigated in (Refs 23-26, 28, 43, 55). On connecting

the inhibiting field to the emitter the distribution of electrons can be found according to energies. Richardsor determined the distribution functions of the electrons, which were emitted by the influence of numerous active gases on the alloy K_2Na, according to energies. With respect to the number of investigations carried out in this field, his publications are the only ones. Denisov and Richardson recommended the emission mechanism in 1934 (Refs 24, 27). It is their theory which permits the electron emission of gases on metal during the chemosorption to be explained. Numerous authors have shown that during the chemical reaction also an emission of negative ions is to be observed. This may be explained by the ionization of gas molecules during their reflection from the metal surface. The ionization of molecules may take place only when their electron affinity is greater than the work function of metal. This condition was confirmed for alkaline-metal halogens (Ref 44). The chemosorption of active gas molecules leads to electron emission. The ionic emission is caused by molecules which were not adsorbed on the metal. For this reason the electron emission may be considered to be a direct result of the

chemical reaction. The emission of negative ions must be regarded as an attendant phenomenon. According to certain reasons the separation of H_2O_2 and the chemical electron emission may be considered to be connected processes accompanying the oxidation of metals. Other ways of exoelectron emission are here described briefly, which were investigated in the course of past 10 years: a) emission during phase conversions ("crystal emission"), b) emission during destruction and deformation ("triboemission"), c) after-emission and d) induced photoelectric effect. In conclusion it is stated that the investigation of various ways of emission is still in its initial stage in spite of the relatively large number of publications. There are 10 figures and 124 references, 12 of which are Soviet.

SOV/76-33-2-8/45

5(4), 18(7)

AUTHOR: Roykh, I. L.

TITLE: The Emission of Electrons and H_2O_2 in the Corrosion of Metals (Emissiya elektronov i H_2O_2 pri korrozii metallov)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 2, pp 288 - 293 (USSR)

ABSTRACT: Investigations on electron emission in various reactions have been carried out by Haber and Just (Gaber and Yust) (Ref 1), Richardson et al (Ref 2), B. Krasyuk and V. Kalinin (Ref 5), Kramer (Ref 9), Haxel et al (Gaksel') (Ref 11), Seidl (Seydl) (Ref 14), and Lohff (Loof) (Ref 15), and several other authors (Refs 3,4,6-10,12,13). References 7 and 16 report the finding that there is no relationship between the emission of electrons and the photographic effect of metals, but several important factors were not taken into consideration. In the work reported in this paper the authors show the relationship between the emission of electrons and H_2O_2 in metal oxidation. The aluminum corrosion was investigated using a sharp point counter (Fig 1). The counter is a glass

Card 1/3

balloon with a plate serving as the cathode and a point fastened in the upper section of the balloon serving as the anode. The measured results (Fig 3) show that in the course of the five-hour measurement the emission as a function of the time is represented by a quadratic parabolic function. Photographic methods were developed to study the separation of H_2O_2 in the oxidation of aluminum. For this purpose photographic film with a GOST sensitivity of -1.4 and a photo emulsion Nr 584 was used. Spectrally pure aluminum put at the disposal by Z. V. Vasil'yev was used. The same results were obtained by both the photographic methods used (one method is described in a special paper and another in reference 21). It was found that in the 6 hour interval the H_2O_2 separated according to the parabolic law. It is assumed that at least under certain conditions there exists a relationship between the electron emission and the separation of H_2O_2 in metal corrosion. There are 5 figures, 1 table, and 27 references, 8 of which are Soviet.

The Emission of Electrons and H_2O_2 in the Corrosion of Metals SOV/76-33-2-8/45

ASSOCIATION: Odesskiy tekhnologicheskiy institut im. I. V. Stalina
(Odessa Technological Institute imeni I. V. Stalin)

SUBMITTED: July 1, 1957

Card 3/3

ROYKH, I.L.; ZELITSKAYA, S.G.; BOLOTICH, I.P.; ORDYNSKAYA, V.V.; NEDZVEDSKAYA, N.A.

Study of silicon oxidation in air by optical polarization and photographic methods. Zhur. fiz. khim. 39 no.9:2306-2308 S '65. (MIRA 18:10)

1. Odesskiy tekhnologicheskiy institut imeni M.V. Lomonosova.

L 23870-66 EWT(m)/EWP(t) IJP(c) JD/WB/JH

ACC NR: AP6008624 SOURCE CODE: UR/0365/65/001/006/0677/0680

AUTHORS: Pustotina, S. R.; Tolkachev, V. Ye.; Rafalovich, D. M.; Roykh, I. L.

ORG: Odessa Technological Institute im. M. V. Lomonosov (Odesskiy tekhnologicheskiy institut)

TITLE: Oxidation of Mg, Zn, and Cd films formed by vacuum condensation in a humid atmosphere

SOURCE: Zashchita metallov, v. 1, no. 6, 1965, 677-680

TOPIC TAGS: protective coating, metal film, corrosion resistance, magnesium, zinc, cadmium, metal oxidation

ABSTRACT: Oxidation of Mg, Zn, and Cd vacuum condensates has been studied at various values of relative humidity. The information is of interest because the quality of the metallic films obtained by vacuum spraying is determined mainly by their atmospheric corrosion stability. The investigation was performed by gravimetric and polarized light methods, varying the relative humidity from 0 to 99%, at a temperature of 20C. The results of the study are summarized in Figs. 1 and 2. It was established that the increase of weight and the thickness of the oxidized layer are 4 and 2 times greater for Mg and Cd, respectively, than for Zn. At a relative humidity $< 80\%$ for Cd and Zn and $< 70\%$ for Mg, the protective oxide films are formed in 1 to 2 days of oxidation. The corrosion rate for all 3 condensates increases rapidly at relative

Card 1/2 UDC: 620.193.2

ACC NR: AP6008624

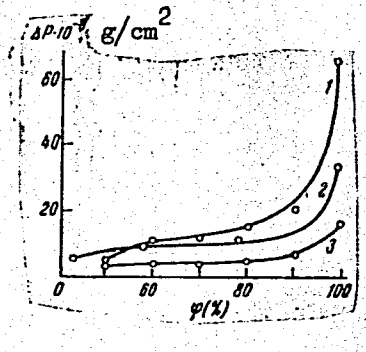


Fig. 1. Weight increase per unit of the surface of the condensate as a function of the relative humidity, during one week of oxidation: 1 - Mg, 2 - Cd, 3 - Zn.

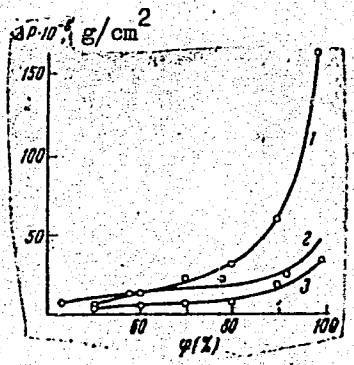


Fig. 2. Thickness of the oxide film formed during the one week of condensate oxidation, as a function of the relative humidity: 1 - Mg, 2 - Cd, 3 - Zn.

humidity, r, above 90%. At these values of r, a porous layer with a large surface area is formed on the metal. Orig. art. has: 5 figures.

SUB CODE: 07, 11/ SUBM DATE: 01Mar65/ ORIG REF: 003/ OTH REF: 010

Card 2/2

L 46996-66 EWP(j)/EWT(m)/T IJP(c) RM/WW

ACC NR: AP6027287 (A) SOURCE CODE: UR/0191/66/000/008/0072/0073

38
36
B

AUTHOR: Kononchik, Ye. T.; Rafalovich, D. M.; Roykh, I. L.

ORG: none

TITLE: Oxidation of polymers in air during mechanical degradation

SOURCE: Plasticheskiye massy, no. 8, 1966, 72-73

TOPIC TAGS: peroxide, polyethylene, polystyrene, polycaprolactam, polymer degradation

ABSTRACT: The mechanical degradation of polymers may cause chemical reactions which evolve volatile substances, in particular, peroxy compounds. A photographic method was used to study the amount of volatile substances evolved during the mechanical degradation of low-pressure polyethylene, polystyrene, polycaprolactam and vulcanized rubber in air. The substances evolved caused a darkening on a photographic plate when it came in contact with its emulsion, and the degree of darkening was proportional to the amount of the substance. The composition of the volatile substances was identified by means of chemical indicators commonly employed for H_2O_2 and by a luminescent method (luminol). The liberated organic peroxides (tert-butyl peroxyacetate, tert-butyl peroxybenzoate, caproic peroxide, tert-butyl hydroperoxide and cumene hydroperoxide) had the same effect on the chemical and luminescent indicators as did H_2O_2 and, like the latter, darkened the photographic plate. Teflon samples

Card 1/2 UDC: 678.019.31 : [678.742.2+678.746.22+678.675'126+678.44

ACC NR: AP6027287

did not darken the photographic plate, indicating that hydrogen atoms must be available in the polymer for peroxides to be formed. Authors thank S. Ye. Bresler and P. Yu. Butyagin for their participation in the discussion of the results. Orig.art. has: 3 figures.

SUB CODE: 07/ SUBM DATE: none/ ORIG REF: 004/ OTH REF: 001

Card 2/2

PUSTOTINA, S.R.; TOLKACHEV, V.Ye.; RAFALOVICH, D.M.; ROYKH, I.L.

Oxidation of vacuum Mg, Sn, and Cd condensates in a humid atmosphere. Zashch.met. 1 no.6:577-580 N-D '65.

(MIRA 18:11)

1. Odesskiy tekhnologicheskiy institut imeni M.V.Lomonosova.

L 2619-66 EWT(m)/EPF(c)/EWP(i)/EWP(t)/EWP(b) IJP(c) JD/WB

ACCESSION NR: AP5011369 UR/0365/65/001/002/0239/0241
620.193.2

55
52
B

AUTHOR: Roykh, I. L.; Yefimovich, Ye. V.; Bolotich, I. P.

TITLE: On atmospheric corrosion of vacuum condensates of aluminum

SOURCE: Zashchita metallov, v. 1, no. 2, 1965, 239-241

TOPIC TAGS: metal vapor deposition, vapor plating, corrosion resistance

ABSTRACT: Atmospheric corrosion of vacuum condensates of aluminum was studied to examine the corrosion resistance of aluminum platings prepared by vacuum condensation, a technique widely used on a commercial scale. The samples, 500-5000 Å in thickness, were prepared by vacuum spraying of aluminum onto a glass gase. The extent of corrosion was measured by photographic and optical polarization techniques. The samples were oxidized for 10 min in air at 20 ± 2°C and at relative humidity of 50 ± 5%. In order to enhance the optical density, the aluminum films stretched on plates were immersed in a 4% Na_2CO_3 solution, and, then, immersed for 1 min in a 50% solution of ethyl alcohol and dried for 10 min at 100°C. The dependence of the number of evolved H_2O_2 molecules upon corrosion duration is shown

Card 1/4

L 2619-66

ACCESSION NR: AP5011369

in fig. 1 of the Enclosure. The dependence of thickness of aluminum oxide layer (in Å) upon corrosion duration is shown in fig. 2 of the Enclosure. The dependence of the number of evolved H_2O_2 molecules upon the quantity of Al_2O_3 molecules formed is shown in fig. 3 of the Enclosure. The dependence of the number of evolved H_2O_2 molecules on the logarithm of corrosion time is shown in fig. 4 of the Enclosure. The correlation between the number of evolved H_2O_2 molecules and the number of Al_2O_3 molecules formed is: $n_{Al_2O_3} = 12 \cdot n_{H_2O_2}$. The linear dependence of the number of evolved H_2O_2 molecules upon the logarithm of corrosion duration is in agreement with data in the literature. Orig. art. has: 3 figures.

ASSOCIATION: Odesskiy tekhnologicheskiy institut (Odessa Institute of Technology)

SUBMITTED: 14Nov64 ENCL: 02 SUB CODE: MM, GC

NO REF SOV: 003 OTHER: 003

Card 2/4

L 2619-66

ACCESSION NR: AP5011369 ENCLOSURE: 01

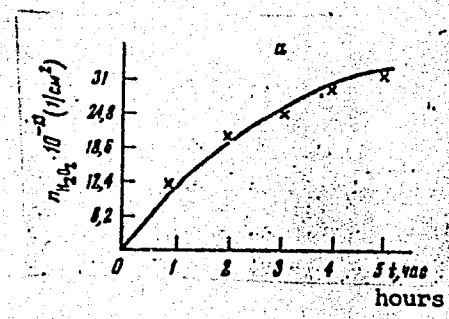


Fig. 1.

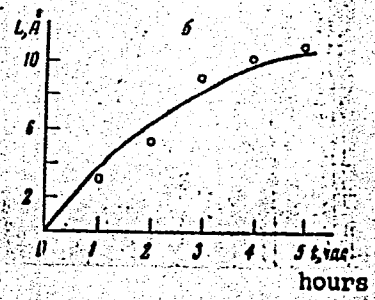


Fig. 2.

Card 3/4

L 2619-66

ACCESSION NR: AP5011369

ENCLOSURE: 02

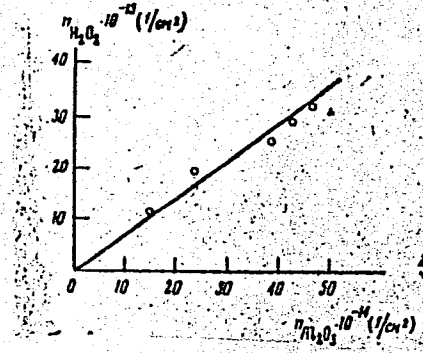


Fig. 3.

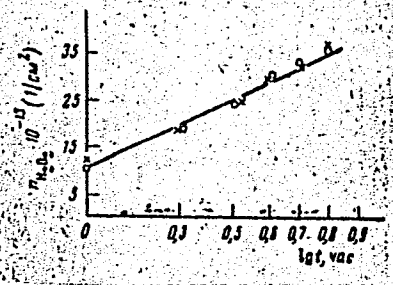


Fig. 4. O--aluminum vacuum condensate; +--massive aluminum samples.

Card 4/4

ROYKH, I.L.; [illegible]; ORDYNSKAYA, V.V.; BELITSKAYA, S.G.;
[illegible]

Decomposition of hydrogen peroxide vapors on the surface of metals and the role of H_2O_2 in atmospheric corrosion. Zhur. fiz. khim. 38 no.6:1588-1591 Je '64.

(MIRA 18:3)

1. Odesskiy tekhnologicheskiy institut imeni Lomonosova.

L 1143-66 EWT(1)/T IJP(c) GG

ACCESSION NR: AP5023694 UR/0076/65/039/009/2306/2308
541.17

AUTHOR: Roykh, I. L.; Belitskaya, S. G.; Bolotich, I. P.; Ordynskaya, V. V.; Nedzvedskaya, N. A.

TITLE: Study of the oxidation of silicon in air by the optical polarization and photographic method

SOURCE: Zhurnal fizicheskoy khimii, v. 39, no. 9, 1965, 2306-2308

TOPIC TAGS: silicon single crystal, hydrogen peroxide, oxidation kinetics

ABSTRACT: The oxidation of the surface of an n-type silicon single crystal oriented in the [111] plane was studied at 70-73% humidity and 28-30°C. The kinetic results representing a three-hour growth of the oxide layer showed that this growth obeys the parabolic law $L^{1.8} = 54.3t$. During the first three hours following the polishing, the oxide layer grew to a thickness of 17.5 Å. It was found that the freshly cleaned silicon surface has an effect on a photographic film, and the photographic density D was plotted as a function of the exposure time. Chemical analyses showed that H_2O_2 was formed during the oxidation of silicon in air. The con-

Card 1/2

L 1143-66

ACCESSION NR: AP5023694

cordance between the kinetics of growth of the oxide layer and the kinetics of evolution of H_2O_2 indicates that the latter may serve as the criterion for the oxidation of silicon in air. Experiments showed that the surface of silicon under vapors of a 10% aqueous solution of hydrogen peroxide decomposes 96.2% of absorbed H_2O_2. Thus, the fraction of H_2O_2 evolved amounts to only a minute part of the H_2O_2 formed during the oxidation. Orig. art. has: 2 figures.

ASSOCIATION: Odesskiy tekhnologicheskiy institut im. M. V. Lomonosova (Odessa Technological Institute)

SUBMITTED: 31Jul64 ENCL: 00 SUB CODE: GC

NO REF SOV: 007 OTHER: 004

Card 2/2

ROYKH, I.L.; YEFIMOVICH, Ye.V.; BOLOTICH, I.P.

Atmospheric corrosion of aluminum vacuum condensates. Zashch. met. 1 no.2:239-241 Mr-Ap '65. (MIRA 18:6)

1. Odesskiy tekhnologicheskiy institut.

ROYKH, I.L.

Determination of the absolute amount of H_2O_2 evolved in the atmospheric corrosion of metals. Zhur. fiz. khim. 36 no.6: 1335-1337 Je'62 (MIRA 17:7)

1. Odesskiy tekhnologicheskiy institut.

ROYKH, I.L., BOLOTICH, I.P.; KOLTUNOVA, L.N.

Determination of the activation energy of formation of hydrogen oxide and hydrogen peroxide in the atmospheric corrosion of Mg and Al. Zhur. fiz. khim. 36 no.9:2052-2054 S '62.
(MIRA 17:6)

1. Odesskiy tekhnologicheskiy institut imeni Lomonosova.

ROYKH, L.I.; RAFALOVICH, D.M.

Relation between the weight increase of the oxide film and the amount of H_2O_2 evolved in the atmospheric corrosion of magnesium. Zhur. fiz. khim. 36 no.6:1198-1201 Je '62. (MIRA 17:7)

1. Odesskiy tekhnologicheskiy institut.

ROYKH, I.L.; BELITSKAYA, S.G.

Atmospheric corrosion of magnesium in the corona discharge.
Zhur.fiz.khim. 37 no.8:1694-1698 Ag '63. (MIRA 16:9)

1. Odesskiy tekhnologicheskiy institut.
(Magnesium--Corrosion) (Electric discharges)

ROYKH, I.L.; KONONCHIK, Ye.T.

Dependence of the amount of emitted H_2O_2 in the atmospheric corrosion of aluminum on air pressure. Zhur.fiz.khim. 37 no.2: 433-436 F '63. (MIRA 16:5)

1. Odesskiy tekhnologicheskiy institut imeni Lomonosova.
(Aluminum--Corrosion) (Hydrogen peroxide)

ROYKH, I.L.; ORDYNSKAYA, V.V.; BOLOTICH, I.P.

Effect of mechanical treatment on the surface area of metals.
Dokl. AN SSSR 146 no.6:1316-1317 O '62. (MIRA 15:10)

1. Odesskiy tekhnologicheskiy institut im. M.V. Lomonosova.
Predstavleno akademikom L.A. Artsimovichem.
(Surfaces (Technology)) (Metals—Finishing)

S/076/63/037/002/014/018
B144/B160

AUTHORS: Roykh, I. L., Kononchik, Ye. T.

TITLE: Dependence between the H_2O_2 volume evolved in atmospheric corrosion of Al on the atmospheric pressure

PERIODICAL: Zhurnal fizicheskoy khimii, v. 37, no. 2, 1963, 433-436

TEXT: The evolution of H_2O_2 as a function of the partial oxygen pressure was studied in an apparatus where the elevated surface of an Al disk rotating at 1 rev/0.72 sec was dressed continuously by a fixed cutter and the H_2O_2 molecules separating owing to corrosion were registered photographically. The pressure effect of the air was investigated in the 5-760 mm Hg range by placing the whole apparatus in a vacuum drum, evacuating for 3-6 min, drying with P_2O_5 for 10 min, rotating the disk under the cutter for 3 min, and admitting air for 1 min. The film was sensitized with 4% Na_2CO_3 and 50% ethanol, and by heating to $\sim 90^{\circ}C$

Dependence between the H_2O_2 ...

after exposure. D the optical density of the film blackening, increased sharply between 5 and 100 mm Hg and then fell steadily. Above 25 mm Hg the curve was parabolic. A diagram is given for converting D into the number of H_2O_2 molecules evolved, the method will be described elsewhere. The curve shows that H_2O_2 at first evolves at the expense of atmospheric oxygen and then a protective film forms. The curves plotted in the 0.06-0.4 sec range for the kinetics of H_2O_2 evolution in atmospheric corrosion show that the process is linear up to 25 mm Hg and parabolic from 25 to 300 mm Hg. There are 8 figures.

ASSOCIATION: Odesskiy tekhnologicheskiy institut im. M. V. Lomonosova (Odessa Technological Institute imeni M. V. Lomonosov)

SUBMITTED: July 24, 1961

Card 2/2

S/020/62/146/006/008/016
B104/B186

AUTHORS: Roykh, I. L., Ordynskaya, V. V., Bolotich, I. P.

TITLE: The influence of machining on the finish size of metal surfaces

PERIODICAL: Akademiya nauk SSSR, Doklady, v. 146, no. 6, 1962, 1316-1317

TEXT: The influence of different machining methods (cutting, shaping, milling and grinding) on the true surfaces of Mg, Al, steel Ст-3 (St-3), steel Ст-45 (St-45), bronze and cast iron is investigated using a profilometer of the type Kalibr-VEI. With this instrument, surfaces of the 6th and up to the 14th class of surface finish can be examined. The enlargement varied between the limits of $2 \cdot 10^3$ and $12 \cdot 10^4$ vertically, between 116.7 and 4200 horizontally. In the instrument a diamond tip (radius of curvature 1.25 μ) exerts a pressure of 0.1 g against the metal surface. For all metals and all grades of finish the ratio of $n = S_{measured}/S_{geom} = 1/\sin(\alpha/2)$ was almost equal to unity. The angle α, defined as the apex angle of the four-faced pyramids constituting the metal

Card 1/2

surface, showed only small variations from 168 $\pm$ 2° in all of the test pieces. From the results of 200 profilograms it follows that the kind of machining and the degree of surface finish exert little influence on $S_{measured}$. Differences between true and measured surface values are attributed to unevennesses characteristic of surface qualities far exceeding the highest measurable classes of finish quality. There is 1 figure.

ASSOCIATION: Odesskiy tekhnologicheskiy institut im. M. V. Lomonosova (Odessa Technological Institute imeni M. V. Lomonosov)

PRESENTED: May 28, 1962, by L. A. Artsimovich, Academician

SUBMITTED: May 25, 1962

ROYKH, I.L.; ORDYNSKAYA, V.V.

Effect of the mechanical treatment of the surface on the evolution of H_2O_2 in the atmospheric corrosion of metals. Zhur.prikl.khim. 34 no.9:1979-1986 S '61. (MIRA 14:9)

1. Odesskiy tekhnologicheskiy institut imeni I.V. Stalina.
(Metals—Corrosion) (Hydrogen peroxide)

27342
S/080/61/034/009/005/016
D204/D305

18.8300

AUTHORS: Roykh, I.L., and Ordynskaya, V.V.

TITLE: Influence of mechanical surface treatment on H_2O_2 evolution in the atmospheric corrosion of metals

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 9, 1961, 1979 - 1986

TEXT: The influence on the mechanism of oxidation of magnesium, aluminum, zinc and cadmium of abrading their surfaces with wheels of different grain sizes was investigated by means of a photographic method. This was based on the photographic activity of H_2O_2 evolved during the corrosion of the above metals. For investigating the H_2O_2 evolution kinetics during oxidation, six metal specimens, cleaned by hand on an abrasive wheel, were placed on a photographic plate for various lengths of time. Successive specimens were removed from the plate at two minute intervals. The photogra-

Card 1/4

Influence of mechanical surface ...

phic plates were developed 15-20 hours after exposure. Six degrees of optical blackening (D_{kin}), depending on the time of contact between specimen and photographic emulsion, were obtained on each plate. The values of D_{kin} were used in order to plot H_2O_2 evolution kinetics curves, n-t, where n is the relative number of H_2O_2 particles having struck the photographic plate. The value of n was found from the characteristic curve representing the dependence of D on lg t. In order to obtain the characteristic curve, aluminum specimens, cleaned on an emery wheel, no. 180, were placed on a photographic plate for 2, 4 ... 24 minutes, the specimen surface being cleaned every two minutes. This enabled the quality of H_2O_2 molecules separated from the metal and hitting the photographic emulsion film, to be increased to an integer number. The number of molecules separated in two minutes was taken as the unit of measurement. The magnitude of the values of $D_{char.}$ obtained by photometering, was found to depend on the length of contact between the

Card 2/4

Influence of mechanical surface ...

specimen and the photographic plate. It was found that in the first stages of atmospheric corrosion of metals, the quantity of H_2O_2 evolved increased with increase of surface roughness. Kinetic investigations of H_2O_2 evolution in an interval of from 2-12 minutes and from 1-5 hours, after grinding the surface with emery wheels of six degrees of coarseness, showed that a parabolic relationship exists between the rate of H_2O_2 evolution and the degree of surface coarseness. On flat grinding of metals to different degrees of surface cleanliness, the increase in roughness, as determined by the degree of unevenness of the profile, affects metals of high chemical activity to a greater extent, increasing their rate of corrosion. Passivation by preliminary radiation in a corona discharge field considerably decreases the influence of roughness. Similar results are obtained in the later stages of oxidation (12 minutes), as in the earlier ones (2 minutes), owing to the formation of the protective film. In the interval of 1-5 hours after the beginning of oxidation, a change in roughness has practi-

Card 3/4

Influence of mechanical surface ...

cally no effect on H_2O_2 evolution. There are 7 figures, 3 tables and 12 references: 11 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: P.M. Aziz and H.P. Godard, J. Electrochem. Soc., 104, 738, 1957.

ASSOCIATION: Odesskiy tekhnologicheskiy institut imeni I.V. Stalina (Odessa Technological Institute imeni I.V. Stalin)

SUBMITTED: August 11, 1960

Card 4/4

26865
S/080/61/034/004/006/012
A057/A129

18.8300 1454, 1521, 1496, 4016

AUTHORS: Roykh, I. L., Rafalovich, D. M.

TITLE: The effect of relative humidity of the air on the formation of H_2O_2 in atmospheric corrosion of magnesium and aluminum

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 4, 1961, 864 - 870

TEXT: By means of a photographic method the evolution of H_2O_2 during the first 15 minutes and the first 6 hours of atmospheric corrosion of magnesium and aluminum, the relative air humidity φ varying from 0 to 90 %, was investigated. It was observed that the amount p of H_2O_2 formed increases with φ, and log p = $a\varphi + b$. In the first 6 hours of corrosion at φ = 0 - 60 % the evolution of H_2O_2 is varying. A parabolic dependence between p and time t is observed at φ = 60 %, while for $\varphi <$ 60 % and the intervals 0 - 3 hours and 3 - 6 hours parabolic equations with different coefficients are valid. The effect of relative humidity φ of the air was investigated gravimetrically by W. H. I. Vernon (Ref. 1: Trans. Farad. Soc., 27, 255, 582, 1931; and Ref. 2: Trans. Farad. Soc., 31, 1668, 1935) on steel and copper, and by T.I. Lukonina et al. (Ref. 4 : ZL, 22, 1463, 1955) on A 16 (D 16) and B95 (V 95) aluminum alloys. A sharp increase

Card 1/6

The effect of relative humidity ....

on the bottom of the cylindrical hermetically closed glass box, where the experiments were carried out. After exposure to the H_2O_2 evolved by the sample at a certain humidity in the test box, the photoplates were developed and the optical density D_0 of the blackening was determined. The dependence of the optical density D of the photoplate blackening after exposure to a solution of H_2O_2 of a certain concentration at a certain humidity was determined and corresponding curves were plotted. From these curves and values obtained with metals the dependence of the evolved H_2O_2 amount p on φ was estimated (Figure 4). The observed increase in p with φ is in agreement with literature data (Ref. 1,2,4) indicating an increase in the oxide film with increasing φ. In the present investigations also the amount p of H_2O_2 evolved from the metals during corrosion at varying φ was determined and the results are shown in Figure 5, demonstrating that for φ = 0 - 90 %, log p = a φ + b (where a and b are different for the interval 0 - 30 % and for 30 - 90 %). These results are in agreement with data given by N., D. Tomashov and A. A. Lokotilov (Ref. 15: Sb. "Korroziya i zashchita staley" ("Corrosion and protection of steel") Mashgizdat 158, 1959). Kinetics of H_2O_2 evolution were studied during the first 6 hours of corrosion for φ = 0,15, 30, 45 and 60 %. The amount of H_2O_2 formed during the first 15 minutes was considered as unit in these experiments. The obtained results plotted in squares of the formed H_2O_2

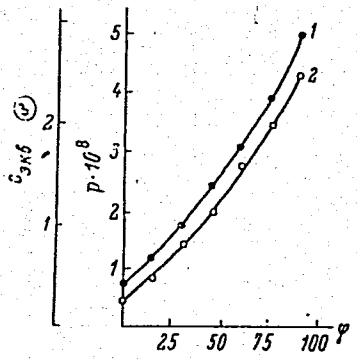
Card 3/6

The effect of relative humidity ....

amount versus corrosion time are shown in Figures 8, 9. For φ = 60 % the parabolic equation $p^2 = kt$ (2) is valid while for φ > 60 % the function shows two segments. Approximately for 0 - 3 hours of corrosion equation (2), and for 3 - 6 hours equation $p^2 = k_1 t + k_2$ (3) is valid. There are 9 figures and 15 references: 12 Soviet-bloc and 3 non-Soviet-bloc.

SUBMITTED: August 1, 1960

Figure 4: Dependence of the amount ($p \cdot 10^8$, g/cm^2) and concentration (c_{equiv} %) of hydrogen peroxide evolved from the metals during the first 15 minutes of oxidation on relative humidity φ (%). 1 - magnesium, 2 - aluminum, 3 - c_{equiv}.



Card 4/6

ROYKH, I. L., Doc Chem Sci, "Separation of H_2O_2 in the atmospheric corrosion of metals." Moscow, 1960. (State Com of Council of Ministers USSR for Chemistry, Order of Labor Red Banner Sci Res Phys-Chem Inst im L. Ya. Karpov). (KL, 3-61, 200).

ROZENFEL'D, I.L.; ZOLOTICH, I.P.

Relation between the H_2O_2 evolved and the quantity of the oxide molecules formed in the atmospheric corrosion of Mg and Al. Dokl. AN SSSR 137 no. 1:126-129 Mr-Ap '61. (MIRA 14:2)

1. Odesskiy tekhnologicheskiy institut im. I.V. Stalina. Predstavleno akademikom A.N. Frumkinym.
(Aluminum--Corrosion) (Magnesium--Corrosion)
(Hydrogen peroxide)

S/020/61/137/001/018/021
B101/B204

AUTHORS: Roykh, I. L. and Bolotich, I. P.

TITLE: [illegible] and the quantity of the oxide molecules formed in the atmospheric corrosion of Mg and Al

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 1, 1961, 126-129

TEXT: It is the purpose of the present paper to prove that the photographic method of studying the atmospheric corrosion of metals by the action of the H_2O_2 formed upon the photoemulsion is physically justified. For this purpose, a comparison between the results obtained by the photographic method and those obtained by studying thin oxide films in polarized light was carried out in the same way as done by P. Drude (Ref. 3), L. Tronstad, and B. Winterbottom (Ref. 4). For the parameters Δ and ψ of the elliptic polarization of light, the Eq. (1) is written down.

$$L = \frac{\Delta - \bar{\Delta}}{A\left(1 - \frac{1}{n_1^2}\right)}; \quad n_1^2 = \frac{1 + \frac{2\psi - 2\bar{\psi}}{\Delta - \bar{\Delta}} \cdot \frac{\cos^2\varphi - a}{a' \sin 2\bar{\psi}}}{\cos^2\varphi}, \qquad (1)$$

(1)

$$A = -\frac{4\pi}{\lambda} \frac{\cos\varphi \sin^2\varphi (\cos^2\varphi - a)}{(\cos^2\varphi - a)^2 + a'^2}; \quad a = \frac{1 - \varkappa^2}{n^2(1 + \varkappa^2)^2}, \quad a' = \frac{2\varkappa}{n^2(1 + \varkappa^2)^2},$$

L = layer thickness, n_1 = refractive index of the layer, λ = wavelength of the incident monochromatic light, n = refractive index of the metal, $\varkappa$ = absorption coefficient of the metal, φ = angle of incidence of the beam, ψ = angle between the oscillation plane of the incident polarized light and the plane of incidence. In the case of reflection, not only the amplitudes of the components, but also the phases change: $\delta_{\parallel} - \delta_{\perp} = \Delta$. $\bar{\Delta}$ and $\bar{\psi}$ relate to the pure metal surface, Δ and ψ to the oxidized surface. For the optical constants of the pure metal surface it holds that:

$n = \sin\varphi\tan\varphi\cos 2\bar{\psi} / (1 + \cos\bar{\Delta} \sin 2\bar{\psi})$; $\varkappa = \sin\bar{\Delta} \tan 2\bar{\psi}$ (2). In order to

create unique reflection conditions, magnesium and aluminum were polished by means of pastes of the GOI (State Institute of Optics) until the unevennesses no longer exceeded 0.14 - 0.1μ . By means of a polarization-goniometer constructed by V. A. Marchenko, $\bar{\Delta}$ and $2\bar{\psi}$ were first determined, and herefrom n and κ were calculated. Next, Δ and 2ψ were determined in the course of the oxidation process, and herefrom L and n_1 were calculated from (1). ДКСВД-120А (SVD-120A) lamp, brightness about 5000 stilb, was used for illumination. The following was found with λ = 5890 A: $\varphi = 60^{\circ}$, for aluminum n = 2.37, κ = 1.53, n_1 = 1.51; for magnesium n = 0.484, κ = 6.93, n_1 = 1.7. As shown in Fig. 1, there is good agreement between the photographic and optical data of the oxidation kinetics. For the increase of L, $L^2 = 31t$ was found for aluminum; for magnesium $L^{2.69} = 63t$ was found. The photographic method was checked by determining the dependence of the density of blackening on the concentration of H_2O_2 vapor. Experiments were carried out at $(20\pm1)^{\circ}$C, the distance between photographic plate and H_2O_2 solution amounted to 2 mm. The

volume v of the H_2O_2 solution evaporated within one minute was found to be 0.218 mg/cm^{2}min for H_2O_2 concentrations between 0.05 - 2 %. According to G. Skatchard (Ref. 7), the molar fraction y_h of the H_2O_2 vapor over the H_2O_2 solution was calculated, and from $n'_{H_2O_2} = vy_hN/M_h$ (3) (N = Avogadro number, M_h = molecular weight of H_2O_2), the number n' of the evaporated H_2O_2 molecules was calculated. The effect produced by the distance between plate and surface of the solution was taken into account by $n'_{H_2O_2} = n^o_{H_2O_2} \exp(-0.417 \cdot 2)$ (4) and, accordingly, the curves D = D(n') were drawn (Fig. 2). Agreement among the values obtained by means of the photographic and optical method respectively proves that between H_2O_2 separation and thickness of the oxide layer there exists linear dependence. This interrelation was more closely studied in consideration of the true surface of the metal. Investigation of the polished

metal surfaces by means of a profilometer of the type "Kalibr" - VEI (All-Union Electrochemical Institute) showed that unevennesses of 0.01 - 2μ cause an increase of the true surface as compared with the geometrical surface by a maximum of only 3%. In consideration of the unevenness coefficient 2.5 determined by O. Erbacher (Ref. 9), the following was found: $1H_2O_2$ —— $11.5Al_2O_3$; $1 H_2O_2$ —— 27.5 MgO (5). Herefrom the conclusion was drawn that a considerable part of H_2O_2 disintegrates again on the metal surface. There are 2 figures and 9 references: 6 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Odesskiy tekhnologicheskiy institut im. I. V. Stalina (Odessa Technological Institute imeni I. V. Stalin)

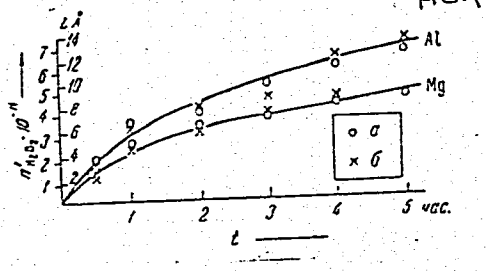
PRESENTED: September 5, 1960, by A. N. Frumkin, Academician

SUBMITTED: September 5, 1960

Relation between separated...

S/020/61/137/001/018/021
B101/B204

FIG. 1



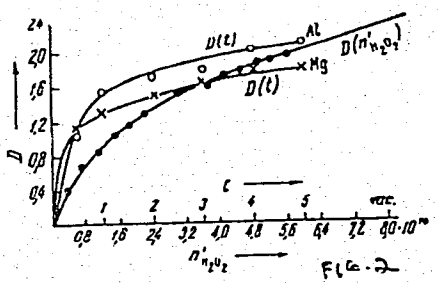


Fig. 2

Card 6/6

L 18315-63 EWT(l)/EWG(k)/EWP(q)/EWT(m)/BDS/EEC(b)-2/ES(w)-2 AFFTC/ASD/ESD-3/AFWL/IJP(C)/SSD Pz-4/Pab-4/Pi-4 JD/AT

ACCESSION NR: AP3004968 S/0076/63/037/008/1694/1698

AUTHOR: Roykh, K. L.; Belitskaya, S. G.

TITLE: Atmospheric corrosion of magnesium in corona discharge

SOURCE: Zhurnal fiz. khimii, v. 37, no. 8, 1963, 1694-1698

TOPIC TAGS: corrosion, protective film, corona discharge, oxidation of metal, inhibition of corrosion, Mg, Zn, Cd, Al, Fe, Cu

ABSTRACT: Authors analyzed the conditions and rate of a protective film on magnesium which is caused by irradiation of corona discharge. A magnesium cylinder, 14 mm in diameter and 15 mm high containing 0.004% Fe, 0.009% Si and 0.0021% Mn, was polished and placed in a corona field 20 mm away from the electrode and then irradiated from 15 to 90 seconds. Corona discharge was produced by an induction coil. Potential difference was 12 kV. Degree of oxidation was determined by photographic method based on the activity of separated hydrogen peroxide.

Card 1/2

L 18315-63

ACCESSION NR: AP3004968

3

Findings indicate that: (i) irradiation in corona field produces an intensive protective film; (ii) effective distance of sample from the electrode is 20-25 mm; (iii) oxidation rate constant is in hyperbolic dependence upon time of primary action of discharge; (iv) irradiation lowers the rate of subsequent oxidation of magnesium in atmosphere; (v) preliminary attempts with Cd and Zn show that protective film formation also takes place on these metals. Orig. art. has: 7 figures.

ASSOCIATION: Odesskiy tekhnologicheskiy institut (Odessa technological institute)

SUBMITTED: 30Sep60 DATE ACQ: 06Sep63 ENCL: 00

SUB CODE: PH, CH NO REF SOV: 011 OTHER: 003

Card 2/2

GURVICH, E.B.; ROYKHEL', V.M.

Epidemiology of water-borne typhoid fever. Zhur.mikrobiol.epid. i immun. 28 no.5:30-33 My '57. (MLRA 10:7)

1. Iz Sanitarno-epidemiologicheskoy stantsii g.Voskresenska Moskovskoy oblasti.
(TYPHOID FEVER, epidemiol.
water-borne outbreak)

ZEYTELENOK, N. A.; REYZIN, F. N.; ROYKHEL',V..M.; GOL'DFARB, M. M.

"Fiziologiye vzaimodeystviya esno-virusov s biologicheskimi substratami, fiziologicheskaya rol' sn-grupp virusov."

report presented at Symp on Virus Diseases, Moscow, 6-9 Oct 64.

Institut poliomielita i virusnykh entsefalitov AMN SSSR, Moskva.

ROYKHEL', V.M.

Purification and concentration of a polyvalent anti-influenza therapeutic and prophylactic horse serum. Vop.med.virus no.8:92-98 '63. (MIRA 17:10)

ROYKIEWICZ, Andrzej

Scientific problems of psychic hygiene; in connection with the 6th Congress of the Polish Association of Psychic Hygiene in Warsaw, May 9-12, 1963. Nauka polska 11 no.5:167-173 '63.

1. Polska Akademia Nauk, Zaklad Higieny Psychicznej i Psychiatrii Dziecicej, Warszawa.

ROYKO, G.M.

Agricultural accidents in Poltava Province in 1955. Ortop., travm. i protez. 18 no.2:56 Mr-Ap '57. (MLRA 10:8)

1. Iz travmatologicheskogo otdeleniya (zav. - N.K.Nikolenko) Poltavskoy oblastnoy bol'nitsy (glavnyy vrach - V.Kh.Shiray)
(POLTAVA PROVINCE--AGRICULTURE--ACCIDENTS)

ROYMER, V.A., KERNEYCHUK, G.P.

Method of approximation for determining the macrostructure of porous catalysts. Zhur.fiz.khim.28 no.10:1812-1819 O'54. (MLRA 8:2)

1. Akademiya nauk USSR. Institut fizicheskoy khimii im. L.V. Pisarzhevskogo, Kiyev.
(Catalysts)

ROYMSHYUSSEL', G., inzh.

Drying grain by the use of sorbents. Mekh. i elek. sots. sel'-khoz. 21 no.3:23-25 '63. (MIRA 16:8)

1. Tekhnicheskiy universitet, Germanskaya Demokraticheskaya Respublika.
(Grain--Drying) (Sorbents)

BARABADZE, I.I.; BAKRADZE, G.S.; BERIDZE, G.I.; VAKHVAKHISHVILI, N.I.; GABUNIYA, G.A.; GABUNIYA, Sh.V.; GANGIYA, A.A.; GOGOBERIDZE, Ya.A.; DZIMISTARISHVILI, A.I. [deceased]; ZNAMENSKIY, K.F.; KVANTALIANI, N.A.; NIKOLAYSHVILI, V.S.; TOPADZE, L.I.; KHUNTSARIYA, A.G.; YAKOBASHVILI, N.Z.; DZHOMARDZHIDZE, G.S., red.; ROYNISHVILI, N.I., red.; PRITYKINA, L.A., red.; KISINA, Ye.I., tekhn. red.

[Food industry of the Georgian S.S.R. during the last 40 years] Pishchevaia promyshlennost' Gruzinskoi SSR za 40 let. Moskva, Pishchepromizdat, 1961. 162 p. (MIRA 14:9)
(Georgia--Food industry)

ROYNISHVILI, N. M.

"Special Calculations in the Protection of a Railroad Bed Against Landslide Phenomena." Dr Tech Sci, All-Union Sci-Res Inst of Railroad Transport, Min Railways, Moscow, 1954. (KL, No 1, Jan 55)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (12)

SO: SUM No. 556, 24 Jun 55

ROYNISHVILI, N.M., dotsent, kandidat tekhnicheskikh nauk.

Initial data and methods of determining the basic dimensions of landslide protection structures. Trudy Tb IIZHT no.28:35-104 '55. (Railroad engineering) (Landslides) (MLRA 9:2)

ROYNISHVILI, N.M., kandidat tekhnicheskikh nauk.

Anti-landslide catch ditches. Transp.stroi. 6 no.5:15-17 My '56.
(MLRA 9:8)

(Mountain railroads)

ROYNISHVILI, N.M., professor, doktor tekhnicheskikh nauk (Tbilisi); LEZHAVA, B.N., kandidat tekhnicheskikh nauk (Tbilisi); MAMASAKHLISOV, G.I., kandidat tekhnicheskikh nauk (Tbilisi); PODVYAZKIN, K.A., kandidat tekhnicheskikh nauk (Leningrad); POVARENKO, S.D., dotsent (Leningrad); ZELEVICH, P.M., inzhener.

"General course in railroad engineering." K.M. Dobrosel'skii and others. Reviewed by N.M. Roinishvili and others. Zel.dor.transp. 39 no.4:90-93 Ap '57. (MLRA 10:5)

(Railroad engineering)
(Dobrosel'skii, K.M.)
(Nikolaev, I.I.) (Chernyshev, M.A.)
(Shilovskii, V.A.)

ROYNISHVILI, N.M.

Urgent tasks for the increase of the efficiency of the measures for the control of rockfall phenomena. Trudy GPI [Gruz.] no.7: 135-144 '63. (MIRA 18:6)

ROYNISHVILI, N.M., doktor tekhn. nauk

Pay more attention to improving methods of designing landslide preventive structures. Transp. stroi. 13 no.5:47-50 My '63.
(MIRA 16:7)

(Landslides) (Mountain railroads)

ROYNISHVILI, N.M., doktor tekhn.nauk; KONIASHVILI, A.F., kand.tekhn.nauk

Economic comparsion of variants in planning railroad lines. Transp.stroi. 10 no.1:41-44 Ja '60. (MIRA 13:6)
(Railroads--Estimates)

83173

S/056/60/039/002/010/044
B006/B056

24.6900

AUTHORS: Andronikashvili, E. L., Roynishvili, N. N.

TITLE: The Transverse Component of the Momentum of Strange Particles Generated in Penetrating Cosmic Ray Showers

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 2(8), pp. 267 - 270

TEXT: One of the most interesting phenomena of nuclear interaction at high and ultra-high energies is the constancy of the transverse momentum components (P_t) of the secondary cosmic-ray pions and the relatively small spread of momenta round the mean value (0.3 ÷ 0.5) Bev/c. The transverse components of the momenta of nucleons, antinucleons, and strange particles have hitherto been only little investigated. Perkins and Takibayev found the P_t-value of the three last-mentioned particles to be spread considerably and attaining values up to several Bev/c. The authors of the present paper attempted to carry out a direct measurement of P_t on Λ^0, θ^0, and $\Sigma^{\pm}$ particles recorded in the El'brus

Card 1/3

83173
S/056/60/039/002/010/044
B006/B056

The Transverse Component of the Momentum of Strange Particles Generated in Penetrating Cosmic Ray Showers

laboratory. The particles were recorded by means of a double cloud chamber in a magnetic field. The apparatus and method are more closely described in Refs. 2-7. Measurements were carried out on 20 Λ^0, 21 θ^0, and 30 $\Sigma^{\pm}$ particles, whose other parameters were known. In order to characterize the recording probabilities of the particles, each decay event was provided with a weight W_i^{-1}, where W_i is the a priori probability of its recording. The error in the number of events recorded per P_t interval is then given by $(\Sigma W_i^{-2})^{1/2}$. The recording probability $\overline{W}$ as a function of P_t is shown in Fig. 1. Up to about 2 Bev/c, $\overline{W}$ shows no spread. Fig. 2 shows the P_t-distribution of all decay events of strange particles corrected in this way. The mean values $\overline{P}_t$ measured are given in a table. The P_t-spectrum has its most probable value in the momentum range (0.2 - 0.4) Bev/c, and attains values of up to 3 Bev/c. It is,

Card 2/3

ROYNISHVILI, Nikolay Minovich, prof., doktor tekhn.nauk; DOBSHITS, M.L., inzh., red.; BOBROVA, Ye.N., tekhn.red.

[Structures to protect railroads from earth slides] Protivoobval'nye sooruzheniia na zheleznykh dorogakh. Moskva, Vses. izdatel'sko-poligr.ob"edinenie M-va putei soobshcheniia, 1960. 227 p. (MIRA 13:5)

(Railroad engineering)

SOV/124-58-3-3283

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 3, p 107 (USSR)

AUTHOR: Roynishvili, N. M.

TITLE: Initial Data and Methods of Determining the Basic Dimensions of Protective Structures Against Slides (Iskhodnyye dannyye i metody opredeleniya osnovnykh razmerov protivoobval'nykh zashchitnykh sooruzheniy)

PERIODICAL: Tr. Tbilis. in-ta inzh. zh.-d. transp., 1955, Nr 28, pp 35-104

ABSTRACT: Observational results are given describing the fall of rocks on 17 open-cut sections of railway track differing in type of profile, slope grade, rock-falling height, character of surface covering, geological structure, and type of rock formations. Fall of rocks was caused by works necessitating climbing on top of the open cuts. Motion of a rock within the limits of a single rebound consists in the trajectory equation of a body thrown at a certain angle to the surface of the slope with an initial velocity v_o; the velocity vector forms an angle designated β with the vertical. The magnitude of β was determined indirectly according to the greatest distance of rock

Card 1/4

Initial Data and Methods of Determining the Basic Dimensions (cont.)

fall l_{max}. Data processing of the in-situ observations was performed statistically by plotting the nomograms of relative recurrence of velocity values as dependent upon the height of fall H and the determination of the parameters of the probability-distribution curve. Several curves for the values of rock velocities are given. For calculation purposes, the final velocity of rocks was determined by the semiempirical formula

$$v_k = \mu \sqrt{2gH} \qquad (\mu = \sqrt{1 - k \cot \alpha}) \qquad (1)$$

where α is the embankment slope angle and k is a coefficient characterizing the resistance to the motion of rocks along the slope. Curves of the calculated velocities and coefficient values for μ and k are given for the velocity range of up to 40-45 m/sec. Depending on the steepness of the slope three velocity ranges are defined: 1) decelerating motion on gently sloping faces (less than 28°), where a fall starts at some initial velocity and decelerates gradually to zero; 2) accelerating motion on steep slopes (from 28° to 60°) where a fall starts with a rolling motion and develops into rebounding motion; and 3) free fall on extremely steep slopes (over 60°). For cases of tree and shrub-covered slopes a coefficient $\eta < 1$ is introduced into formula (1). Expressions for v_k are given for cases of irregular slopes consisting of sections

Initial Data and Methods of Determining the Basic Dimensions (cont.)

of various grades. A velocity-vector angle formula is selected

$$\beta = [\ 200 + 2\ a\ (1 - a^{\circ} / 45^{\circ})\ ]\ v_k^{-1/3}$$

Determination of β allows the use of conventional formulas for the rock-rebound trajectory elements and the determination of the overall dimensions of necessary protective structures [G. M. Shakhunyants. Zemlyannoye polotno zheleznykh dorog (Earthen Railroad Track Beds), Moscow, Transzheldorizdat, 1953]. Observational data as to the greatest height of rock flight over the head of the rails h_{max} are given and the recovery coefficients are calculated according to the formula

$$\rho = \sqrt{\frac{h\ max}{H + (v_k^2 / 2\ g) \cos^2 \beta}}$$

Calculation of the overall dimensions for lateral antislide-protection structures of railway tracks consists in the calculation of rock flight and rebound over reach and are based on finding the rock trajectory for the most unfavorable conditions possible in the vicinity of the protective structure. Design calculation data for strength and stability of protective antislide structures are given. An approximate method of dynamic design calculation of

Initial Data and Methods of Determining the Basic Dimensions (cont.)

protective structures equipped with an earth fill for the purpose of damping the impacts is given, and a recommended procedure for the calculation of such structures is demonstrated. Bibliography: 10 references.

G. I. Ter-Stepanyan

MANDZHAVIDZE, Z.Sh.; ROYNISHVILI, N.N.; GERSAMIYA, D.V.; KOZLOV, A.A.; KOTLYAREVSKIY, D.M.; PURTSELADZE, T.D.; TATALASHVILI, N.G.; SHTEMANETYAN, G.Z.

Lifetime of charge $\sum^{\pm}$ hyperons. Trudy Inst.fiz.AN Gruz.SSR 8:125-129 '62. (MIRA 16:2)

(Hyperons)

KOZLOV, A.A.; KOTLYAREVSKIY, D.I.; ROYNISHVILI, N.N.; TATALASHVILI, N.G.; TSAGARELI, E.I.; TSINTSBADZE, A.I.; TSINTSADZE, V.D.; DZIDZIGURI, R.I.

Method of studying tracks in the Wilson magnetic chamber. Soob. AN Gruz. SSR 19 no.2:143-150 Ag '57. (MIRA 11:3)

1. Institut fiziki AN GruzSSR, Tbilisi. Predstavleno akademikom E.L. Andronikashvili.

(Cloud chamber)

AUTHORS: Mandzhavidze, Z. Sh., Roynishvili, N. N., Chikovani, G. Ye. SOV/56-34-5-9/61

TITLE: The Observation of the Decays of Charged Particles in a Double Cloud Chamber (Nablyudeniye raspadov zaryazhennykh chastits v sdvoyennoy kamere Vil'sona)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol. 34, Nr 5, pp. 1110-1115 (USSR)

ABSTRACT: This paper analyzes 10 decays of heavy charged particles. These particles were observed by means of a device which is similar to the device of C.H. Jork et al. (Ref 2). Investigations were carried out in the Vysokogornaya El'brusskaya kosmicheskaya laboratoriya (El'brus High Mountain Cosmic Laboratory). For the measurements discussed in this paper a rectangular double cloud chamber was used. This cloud chamber consists of two independent volumes (each of them has the dimensions 280x100x110 mm) and three sections for the absorber. The two independent volumes are united by the same carcass. The cloud chamber was filled with argon (1000 torr) and a mixture of 70 % ethyl alcohol and 30 % water was used as condensate. The first series of experiments was carried out with copper ab-

Card 1/4

sorbers, the second with lead absorbers. The magnetic field strength in the working volume had the value 4300 Oe. 11559 photographs were taken within 2836 hours, and 2269 penetrating showers were recorded by these photographs. Moreover, 10 forked tracks were observed on these photographs, they may be interpreted as $V^{\pm}$-decays. The authors found also 22 V^{0}-decays, 1 decay of a τ^{+}-meson, 1 decay of 2 pions (while they were moving) and 13 stars. The results of the measurements of the momenta, angles and the approximate values of the ionization are compiled in a table. All the observed decays, (with the exception of one), taking account of the observation errors, lie within the allowed range for hyperons and K-mesons. Only one case can be exactly interpreted as the decay of a K-meson, for all the other cases it is impossible to discern between K - and Y - decays. Among the decay products no proton was found. The $V^{\pm}$-decays, are divided into two groups, according to the character of production. The 6 particles of the first group have a very low ionization caused by the primary particles. The second group consists of 4 slow particles with rather a high ionization. These 4 particles are not con-

nected with a visible interaction and are generated far from the place of the decay. One decay is interpreted as the decay of a particle which is heavier than a K-meson. It is possible to assume that this particle is the charged analogon of the neutral meson the decay of which was observed by Kovan (Ref 12).
The authors thank Professor E.L. Andronikashvili for supervising these investigations, and also the collaborators of the Tbilisskiy gosudarstvennyy universitet (Tbilisi State University), L.D. Gedevanishvili and E.I. Tsagareli, and also the collaborators of the Institut fiziki (Physics Institute) R.I. Dzidziguri, A.I. Tsintsabadze, V.D. Tsintsadze. There are 4 figures, 3 tables, and 13 references, 5 of which are Soviet.

ASSOCIATION: Institut fiziki Akademii nauk Gruzinskoy SSR (Physics Institute AS Georgian SSR) Tbilisskiy gosudarstvennyy universitet (Tbilisi State University)

SUBMITTED: April 12, 1957

31542
S/627/60/002/000/027/027
D299/D304

3.2410 (3205, 2705, 1559)

AUTHORS: Mandzhavidze, Z. Sh., Roynishvili, N. N., Chukovani, G. Ye., Kozlov, A. A., Kotlyarevskiy, D. M., Tatalashvili, N. G., and Tsintsibadze, A. I.

TITLE: Study of penetrating showers at an altitude of 2000 m above sea level

SOURCE: International Conference on Cosmic Radiation. Moscow, 1959. Trudy. v. 2. Shirokiye atmosfernyye livni i kaskadnyye protsessy, 338-341

TEXT: The properties of unstable heavy particles were studied by means of a magnetic cloud chamber with lead absorbers. Among 8700 nuclear interactions, 139 cases of decay of neutral particles were observed, as well as 29 decay processes of charged strange particles. In addition, 11 decay processes, described by the authors in an earlier work, are also included in the study. As a result of the investigation of neutral particles, 45 V^0-shaped tracks were iden-

Card 1/ 4

31542
S/627/60/002/000/027/027
D299/D304

Study of penetrating ...

tified as decays of Λ^0-hyperons, and 38 - as ϑ^0-mesons. Fifty-six of the remaining V^0-shaped tracks could not be identified. Out of 40 $V^{\pm}$-particles, 1 was interpreted as τ-meson decay, 7 could be interpreted as K-meson decay and 2 - as Σ-hyperons. The other particles could not be interpreted by decay-dynamics only; for their interpretation considerations had to be employed which proceed from the considerable difference in the lifetime of hyperons and K-mesons respectively. In Solov'yev's work (Ref. 3: preprint O.I.Ya. I.) it is shown that for strong interactions involving strange particles, there are no obvious theoretical assumptions which would require conservation of parity. If such interactions are not invariant with respect to space inversion, one should expect the appearance of hyperon polarization in the plane of generation. These considerations were used as a basis for constructing the angular distribution protons of the decay of Λ^0-particles with momenta below 800 Mev./c. Further, the authors investigated the lifetime of

4

Card 2/ 4

Study of penetrating ...

Λ^0-particles by 2 methods. By the first method, they obtained for the mean lifetime the value

$$\tau_{\Lambda^0} = (2{,}83 \overset{+\ 2{,}32}{-\ 0{,}99}) \cdot 10^{-10} \text{ sec}$$

The second method yielded

$$\tau_{\Lambda^0} = (3{,}02 \overset{+\ 1{,}14}{-\ 0{,}72}) \cdot 10^{-10} \text{ sec}$$

Further, an attempt was made to determine the lifetime of Σ-hyperons. Earlier results in this respect are in disagreement. It was found that 13 of the decay processes of charged particles can be considered as $\Sigma^{\pm}$-hyperons. The lifetime of 9 of these particles is

Card 3/4

Study of penetrating ...

$$\tau_{\Sigma^{\pm}} = \leqslant (0{,}57 \begin{smallmatrix} + 0{,}36 \\ - 0{,}16 \end{smallmatrix}) \cdot 10^{-10} \text{ sec}$$

There are 1 table and 9 references: 3 Soviet-bloc and 6 non-Soviet-bloc. The references to the English-language publications read as follows: S. Hayakawa. Phys. Rev., 108, 1533, 1957; D. A. Glaser. Ann. International Conference on High Energy Physics at CERN, 1958; I. Snayder, W. Y. Chang and I. G. Gupta. Phys. Rev., 106, 149, 1957.

ASSOCIATION: Institut fiziki AN Gruz.SSR (Physics Institute AS Georgian SSR)

Card 4/4

S/058/62/000/006/013/136
A061/A101

AUTHORS: Mandzhavidze, Z. Sh., Roynishvili, N. N., Chikovani, G. Ye.

TITLE: Angular distribution of Λ^0-hyperon decay products

PERIODICAL: Referativnyy zhurnal, Fizika, no. 6, 1962, 33, abstract 6B228 ("Tr. In-ta fiz. AN GruzSSR", 1960, v. 7, 193 - 195, English summary)

TEXT: If, in strong interactions with the participation of strange particles, parity is not conserved, this may manifest itself in the presence of "forward-backward" asymmetry in Λ^0-hyperon decay with respect to the line of flight of hyperons in the center-of-mass system of their generation. The literature contains indications as to the presence of the effect of asymmetry in the decay of Λ^0 generated on compound nuclei and in hydrogen by pions with a momentum of some Bev/c and by particles of cosmic radiation. On the other hand, no longitudinal polarization of Λ^0-hyperons has been established in a number of studies conducted on hydrogen at low and mean energies. In the present experiment, conducted with the aid of a doubled Wilson chamber at 1,800 m above sea level,

Card 1/2

Card 2

S/058/62/000/003/032/092
A061/A101

24.6700

AUTHORS: Mandzhavidze, Z. Sh., Roynishvili, N. N.

TITLE: Strange-particle energy distribution

PERIODICAL: Referativnyy zhurnal, Fizika, no. 3, 1962, 50, abstract 3B412 ("Pizikis institutis shromebi. Sakartvelos SSR Metsnierebata Akademia, Tr. In-ta fiz. AN GruzSSR", 1960, v. 7, 197 - 200, English summary)

TEXT: Spectra of Λ^0, θ^0, and $\Sigma^{\pm}$ particles generated in lead by cosmic ray particles with a mean energy of ~20 Bev were taken at 1,800 m above sea level using a rectangular double Wilson chamber placed in the magnetic field. The spectra of Λ^0 particles and $\Sigma^{\pm}$ hyperons have similar distributions of about equal width with a sharp maximum in the 500-Mev region, while the θ^0 meson spectrum appears as sloping and spreads up to 5.5-Bev energies. This result may be explained either by the strong anisotropy of the angular distribution of Λ^0 and $\Sigma^{\pm}$ hyperons in the center-of-inertia system or by similar features of the generation of different types of baryons on quasi-free nucleons of the target.
[Abstracter's note: Complete translation] V. Guzhavin

Card 1/1

ANDRONIKASHVILI, E.L.; ROYNISHVILI, N.N.

Transverse component of the pulse of strange particles generated in penetrating showers of cosmic rays. Zhur. eksp. i teor. fiz. 39 no.2:267-270 Ag '60. (MIRA 13:9)

1. Institut fiziki Akademii nauk Gruzinskoy SSR.
(Cosmic rays)

ROYNISHVILI, N.N.

Analysis of the distribution of transverse impulses of pions and strange particles. Zhur.eksp.i teor.fiz. 41 no.3:919-923 S '61. (MIRA 14:10)

1. Institut fiziki AN Gruzinskoy SSR.
(Particles (Nuclear physics))

S/048/62/026/006/004/020
B125/B112

AUTHORS: Mandzhavidze, Z. Sh., and Roynishvili, N. N.

TITLE: Some problems of strange particle production

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 6, 1962, 716 - 721

TEXT: A study was made of the energy distribution of the heavy unstable particles, with energies of some dozens of Bev, present in the penetrating cosmic radiation showers. Further, the distribution of the transverse momenta of the strange particles was investigated on the basis of observations made on 50Λ^0-, 42 θ^0-, and 18$\Sigma^{\pm}$-particles in a Wilson chamber at 1800 m above sea level. The obvious similarity of the $\Sigma^{\pm}$- and Λ^0-hyperons points to a similarity of the baryon energy distribution in multiple particle production at some dozens of Bev. If the intranuclear cascade processes influence the production of Λ^0-, $\Sigma^{\pm}$- and θ^0-particles equally, then the energy distribution of the Λ^0- and also of the $\Sigma^{\pm}$-hyperons is much

Card 1/3

more anisotropic than that of the θ^0-mesons. The present results are well consistent with new results got with 8 Bev pions in a propane chamber of the OIYaI. The difference in the mean values of the transverse momenta $p_\perp$ of the non-pion particles is probably due to the small increase of $p_\perp$ in the energy range between the threshold and 10 Bev. If the thermal motion of the liquid elements causes the $p_\perp$-spectra, then the $p_\perp$-spectrum of the mixture of the particles observed determines their temperature of departure $kT(1.1^{+0.6}_{-0.1})m_\pi c^2$. This temperature agrees well with the transverse pion momenta.

$$\left\langle\left(\frac{p_\perp}{mc}\right)^2\right\rangle = \left\langle\left(\frac{p_\perp}{mc}\right)^2\right\rangle_{a=0} + a^2\left(1+2\left\langle\left(\frac{p_\perp}{mc}\right)^2\right\rangle_{a=0}\right),$$

are the root mean square momenta as a function of the hydrodynamic velocity. At different values of a, the root mean square momenta depend approximately linearly on their temperature of departure. If Landau's theory is valid also if $E_0 = 10^{12}$ev, then the transverse heavy particle momenta will probably increase rapidly if the energy increases from 10^{10} to 10^{12}ev. If

the conditions of existence of the transverse momenta imply Heisenberg's uncertainty principle, then the results of the present paper indicate the structure of the region of particle production. The region of strange particle production has the radius $\langle r^2 \rangle_V^{1/2} \geqslant 0.37 \cdot 10^{-13}$ cm. There are 8 figures. The most important English-language reference is: E. R. Awunor-Renner, L. Blaskovith, R. French, C. Chesquer, Y. B. de Minvielle, Devau, W. W. Neale, C. Pelletier, P. Rivet, A. B. Sahiar, Y. O. Skillicon, Nuovo cimento, 17, 134 (1960).

Card 3/3

RAZDOL'SKAYA, L.A.; ROYNISHVILI, N.N.; GABUNIYA, L.L.; MANDRITSKAYA, K.V.; TATALASHVILI, N.G.

Program for processing the tracks of penetrating cosmic ray showers with energies of 10^{10} to 10^{12} ev. Fiz. chast. vys. energ. no.1:65-84 '65. (MIRA 18:12)

L 4520-66 EWT(d)/EWT(m)/FCC/T IJP(c)

ACC NR: AP5024662 44,55 SOURCE CODE: UR/0048/65/029/009/1784/1787

AUTHOR: Roynishvili, N.N.; Mandritskaya, K.V. 44,55

49
42
03

ORG: none

TITLE: Analysis of experimental data characterized by power law distributions /Report, All-Union Conference on Cosmic Ray Physics held at Apatity 24-31 August 1964/ 44,55

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 9, 1965, 1784-1787

TOPIC TAGS: statistics, 16,44,55 error statistics, distribution function, nuclear physics, cosmic ray

ABSTRACT: This paper is concerned with the determination of the exponent m in a distribution of the type $x^m dx$ from experimental data. The frequently employed method of least squares for estimating m and the chi-square criterion for comparing hypothetical values of m are not only very laborious for a power law distribution but they do not give optimum results. The maximum likelihood estimate of m and the likelihood ratio criterion for comparing hypothetical values of m are presented and their advantages are pointed out. In order to normalize the distribution the range of the independent variable x is restricted to the interval (0, 1). The likelihood function then becomes a very simple function of the average of the logarithms of the sample (experimental) values and the probability distribution for the likelihood ratio becomes an incomplete

Card 1/2

L 4520-66

ACC NR: AP5024662

gamma function, tables of which are readily available. The maximum likelihood estimate for the power law distribution is not only very simple to compute but, unlike the least square estimate, it is efficient. The bias of the maximum likelihood estimate is pointed out and removed. The application of the methods discussed is illustrated with several examples from the fields of nuclear and cosmic ray physics. The authors thank Z.Sh.Mandzhavidze and G.Ye.Chikovani for valuable advice during discussion of the results. Orig. art. has: 16 formulas and 1 table.

SUB CODE: MA, NP/ SUBM DATE: 00/- ORIG REF: 003/ OTH REF: 000

ard 2/2

ROYNISHVILI, N.N.; MANDRITSKAYA, K.V.

Analysis of experimental data satisfying type $x^{m}dx$ distributions. IAd. fiz. 1 no.6:1028-1031 Je '65. (MIRA 18:6)

1. Institut fiziki AN Gruzinskoy SSR.